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ABSTRACT

Karl Bruhn, professor of education at Helsinki University for almost 20 years, in addition to writing a history of education, concentrated particularly on carrying out further investigations with his Helsinki Test which was publicly released in 1953. The use of this test is presented in this posthumous article by Bruhn. The Helsinki Test is a simplification of the Rorschach-type technique, designed so it is possible for the constructor, using relatively simple mathematical procedures, to replace to a relatively great extent, the subjective evaluations that the Rorschach user is commonly confronted with. Instructions for using the test are presented in four sections: (1) experimental apparatus and environment; (2) scoring and different response variables; (3) evaluation of intelligence; and (4) description of character qualities. Test figures are appended with interpretation of varying responses. (JD)

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Department of Education

University of Helsinki

RESEARCH BULLETIN 62

Karl Bruhn

THE HELSINKI TEST
The Inkblots and Using the Test

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THE HELSINKI TEST

The Inkblots and Using the Test

The testfigures are also available as a reprint.

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INTRODUCTION

The creator of the Helsinki test Karl Bruhn was the Swedish professor of education at Helsinki University for almost twenty years (1942-61). Before that he had been the head of a division at the National Board of Education as well as a secondary school teacher. He was born in Kotka on the 28th of January 1894 and died in Helsinki on the 8th of March 1978.

Karl Bruhn was in his time one of the most distinguished pioneers of educational and psychological research in Finland. The focus of his interest was the entire field of education but he devoted himself particularly to educational psychology and the history of education. Throughout his whole life he kept an open mind and a sense for all the aspects of various phenomena in all his research activities. He can be characterized as well as an empiricist and as a humanist. Independence, courage and initiative were among his basic characteristics. He generally did not like to take the easiest course of action but often liked to go against the mainstream meaning to change its course. He was one of those very rare people who have the courage to be themselves in their lives.

Karl Bruhn was exceptionally energetic, which made him diligently continue his scientific work after retirement. In addition to writing a history of education Bruhn concentrated particularly on carrying out further investigations with his new Helsinki test which was publically released in 1953. The use of this test will be presented in this posthumous article, which he himself wrote.

In the 1950's research on educational psychology was generally increasing and many new methods of measurement were developed.

At that time Bruhn's importance in developing psychological tests was unparallelled. The work he did can even today be considered of permanent value and still new justifying the publication of the Helsinki test in a new, international manual, the pedagogical publication series of the Institute of Education.

Helsinki, August 18, 1984

Paavo Päivänsalo
professor of education

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APPENDICES

1 INTRODUCTORY ORIENTATION

When an intelligence test of some kind is administered to a child for diagnostic purposes, the result may be deceptive. The mistake may depend, as it often does, on the testing psychologist, who is unable to establish the necessary rapport with his subject. But even other sources of error may have a negative effect, or may be misleading for the test. It has been known for decades that temporary depressions and fatigue reduce the mental age value so that even a normally talented person may, at some time, appear mentally retarded or almost as an imbecile. Besides, it is not so seldom that a child whose education has been neglected for one reason or another, reveals an intelligence quotient in a normal test that indicates mental retardation even though the potential intelligence is normal. They do not have the knowledge nor the verbal skill which are prerequisites for a successful test. Therefore one should always be careful in drawing conclusions which can be decisive for a person's future. The Swedish psychologist, Gösta Ekman, stresses that measures that are decisive for a life's destiny must not be based on one single test nor only on testing. And although a cleverly constructed and well-standardised and normalised intelligence test - to the extent that one can judge based on the experiences up to now - usually renders quite reliable results, it would be desirable to always combine an intelligence measurement not only with interviews and like methods, but also with a controlling projective testing. The best and most often used projective tests, the Rorschach inkblot technique, the T.A.T. test, Wartegg's drawing test and the Family test are, however, extraordinarily demanding and sensitive diagnostic instruments, since the interpretation of the results forces the testing psychologist to carry out a series of subtile subjective appraisals. Neither are they

actually standardised and normalised. Such a test always requires special training and lengthy practical experience of the diagnosing person. Such demands probably cannot be placed on an ordinary practising psychologist who must know a little bit of everything. Among the tasks of a practising psychologist are administering intelligence tests, school maturity tests, tests for word-blindness, aptitude tests and furthermore, to provide teachers and parents with therapeutic instructions and advice. The Helsinki test, as presented in this handbook, is primarily meant to provide school psychologists and teachers, lacking the special training needed for a more demanding, subtile projective testing, with a relatively simple aid which can be used as a complement to the regular intelligence tests. Besides, it can be advantageously used for group examinations, in which occupational, societal and even different groups of the mentally ill can be compared with each other.

In principle, the new test is not really new. It is a simplification of the Rorschach-type inkblot technique, which cannot replace the subtile diagnostic instrument of the ingenious Swiss pioneer.[1]

But at the same time, since the further simplification has caused pretentions to be reduced, it has also made it possible for the constructor, using relatively simple mathematical procedures, to replace to a relatively great extent, the subjective valuations that the Rorschach user is always confronted with. The individual variations and the resulting distribution figures for the specific interpretative variables are extraordinarily smaller compared to Rorschach experiments. Therefore we have been able to

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[1] For the origin and development of the test method see Karl Bruhn 1965.

apply correlation estimates and factoranalytical methods on the material gathered, which cannot be applied in the same way to the documentation of testing using other projective tests.[1] Proceeding from the results gathered thus, we have then been able to compile point values by which different attitudes and in part even intellectual capacity can be measured. The values thus attained are approximate and at times quite uncertain. In part this is due to the fact that the test - after more than two decades of work - cannot as yet be considered definitively standardised and normalised. In order to achieve that, new experiments using a representative material would be required.

[1]Particulars on how standardisation and point valuation are executed are included in the following two sources: Karl Bruhn 1962 and 1966.

2 INSTRUCTIONS FOR USING THE TEST

2.1 Experimental apparatus and environment

As with an ordinary Binet testing, a Helsinki experiment must be set at such a time as to enable the subjects to perform at a relative optimum. The best time should be between 9 a.m. and 3 p.m. If the experiment is carried out late in the evening, the number of monotonous, stereotypical interpretations always increase; at times it may even lead to a disposition towards persevering concept-forming, in other words the same interpretation is repeated time and again. Fatigue following a strenuous job also leads to a similar disposition. In testing growing children it is better to use an isolated room at school rather than an environment strange to the testee, even rather than the home environment. The experiment almost always is seen by the subjects as a test. The home does not provide a suitable test atmosphere with the required intense concentration. In a completely strange environment, on the other hand, inhibitions and obstacles arise which result in an increased number of rejections (Versagung). A stimulating aspect, which comes into play when an experiment is arranged in school, is the testee's knowledge that most of his classmates, perhaps the whole class, will participate in the same playful testing.

According to our experience, it is seldom advantageous to start out on an experiment without previous preparation, as is usually the case with Rorschach techniques.

An introduction along the lines of the one suggested by Bruno Klopfer is preferable. The leader of the experiment explains that by spilling ink on a paper and then folding the paper in half, figures emerge which do not directly

represent anything, but which perhaps look like something. A simple demonstration is often necessary when dealing with young children, and particularly with shy, growing children of an early school age. The experimenter takes a piece of paper and creates an inkblot figure in the presence of the testee. The concrete example arouses interest among the young and facilitates the experiment. In very exceptional, rare cases the demonstration can create a source of error: usually the symmetrical figure is something that looks like a butterfly, which can give rise to the testee then producing only or almost only animal interpretations. In our experience though, the risk for such an affect is very small.

The testees' responses and, if possible, even attitudes during the experiment are carefully recorded in the documentation of the experiment: for example if they turn the pictures quickly and nervously, as extrovert, impulsive testees often do, or if they turn the pictures slowly and carefully, as accurate, systematically-functioning pedants, or if the disturbing figures (VIII, XI) evoke shock-like experiences (which often take the form of an interjection or an outcry or also of a sudden blockage). A recommendation to the testee to turn the figure around, which is usual in an ordinary Rorschach testing, is not allowed. But if the testee asks, "Can the picture be turned around?", the tester answers: "You may do exactly as you like." In certain cases it is desirable to indicate the length of time alloted for the test (not including the instruction time); namely it has been noticed that extrovert, impulsive, careless, as well as indifferent, nonchalant, insensitive growing children attempt to complete a task as quickly as possible (2-4 minutes), while introverted psychasthenics, anxious types and pedantic bureaucrats need more time, sometimes as much as one to two hours. If a shy testee does not interpret a great number of figures, a retest

can be conducted immediately following the first experiment, noting this in the documentation of the experiment. Notes of this type do not directly influence the mathematical estimation of a test, but they can prove to be of importance if it becomes necessary to decipher the results of an experiment, arrived at arithmetically.

Some of the pictures require the special attention of the tester. Often Fig. IV is called "animal", "deer", "moose", without the tester knowing whether the testee is identifying two or only one animal, deer or moose. In this particular case it is of decisive importance for the tester to know if the testee has observed the entire picture or only half of it. In this case it is not possible to ask how many animals appear in the picture; such a question would be provocative. The answer would always be: "two animals". The question must be formulated in another way: "Show me the head." Some testees then point out two heads, others (those intellectually weaker) only one. Figure X is often identified as "a person" or "an old man".

If the picture is looked at up-side-down, the interpretation is clear without a doubt: the big antennas sticking out are legs, and the response can be classified as "weak". But if the figure is viewed in its original position, the tester does not know if it is a diver or a person with outstretched arms identified by the testee. One must ask: "Where are the arms?", or "Where are the legs?". This applies as well to Figure XIV, even though, in regard to this figure, this question means less or nothing at all. Figures VIII, IX, and XI are often seen in such a way that the tester cannot, without questions, decide whether or not the testee has based his response on the entire picture or on only a part of the picture. Neither can he decide immediately, without the help of careful questions, whether it is only the outer contours used or whether the disturbing chiaroscuro light effect has in some way determined the response.

All questions, demonstrations and requests should be formulated in such a way that they do not suggest to the testee the production of a particular type of response. Unsuccessful formulations often lead to a misleadingly large number of animal responses, detail responses or so-called turned-around figures.

2.2 Scoring and different response variables

After the documentation of the experiment has been written, comes the scoring of the responses. Let's first look at the content variables. The most common type of responses are the so-called animal responses (A = Tier, according to Rorschach). This type of response, in rounded figures, constitutes nearly 40 % of the interpreted population. Then follow the human responses (H = Mensch); they make up about 20 % of all the responses. Generally about as common, 10-15 %, are the plant responses (Pfl. = Pflanze) on the one hand, and the object responses (Obj.= Object) on the other hand. The latter category includes the identification of objects, created by man, e.g. household utensils, buildings, tools. Also quite common are the anatomical responses (Anat., about 5 %). A person who gives these responses sees entrails, skeletal parts and skeletons in the figures or else he makes macabre interpretations (carcass, rotting corpse). Roughly classifying, we have also included the sexual responses (Sex) in this group since all these types of variables reflect revenge and depressions of a complex-like nature. Less common are responses of parts of the human body and of landscape (Md - menschliches Detail and Landsch, each type 1-2 %). The body parts are, for example, "arm", "foot", "nose", "eye", though not a face in profile or full-faced which are included in H-responses. Besides the pure landscape responses, we have also included among

the Landsch group such responses as islands reflected in water, forests and aerial photographs of landscapes. In addition there are four more exclusive response types which should be mentioned: first, the abstract responses (Abstr.), such as "atomic war", "the first kiss", "desintegration tendency" (all referring to Fig. VIII), "upward striving" (Fig. VI), "worship" (Fig. X); second, the geometric figures, in other words, cross, squares, checks, in which we have also included letters and numbers, that is caligraphic figures (Geom.); third, the geographic answers, of which maps are the most representative types, e.g. the maps of Europe, Australia etc. (Geogr.); and fourth, the chiaroscuro light effect responses such as "fire", "smoke", "cloudbursts", "explosion" and "volcano eruption".

Among the human responses there is a group that is not uncommon which we have called satyr responses. Usually they are included among human responses, but are also classified on their own, actually, in a way, twice. Included here are faces in profile (often leering) or full-front, exotic figures, such as shamans and magicians, dancers, clowns, caricatures; we have also included among the satyrs object responses, such as leering face masks and scarecrows; these are both object responses and satyr responses which are also counted twice, in a way. The so-called animal detail responses (Td.) form a similar kind of group. They are counted as animal responses, but are classified as well on their own. We shall return to the diagnostic meaning of some of these types of responses within another context.

We come now to the formal response variables, which Rorschach first drew attention to. First of all the number of responses (Ant. sv.) is considered: we find many responses among the impulsive and explosive extroverts,

at times also among the introvert, pedantic bureaucratic types; a comparatively normal number among the systematically-functioning, generally introverted types; very few among the closed and inhibited types, at times even among the helpless, intellectually retarded who have been confronted with an endeavor which in a way is overpowering. In opposition to the variable is the blank response (bl., German's Versagen). The psychasthenically blocked, the suspicious inhibited and the depressed as well as the helpless oligophrenics naturally give many blank responses, while such responses are unusual among normal, impulsive extroverts and systematically-functioning introverts and ambiversive types. Then we have the intelligence variables. Movement responses (B, from German's Bewegung) and person epithets (Epit.) are positive intelligence variables. The former can be divided into three, in a way four categories: firstly, people clearly in movement, e.g. dancing, diving or jumping people, people fighting, community singing, rocking pop singers; secondly, animals clearly in movement, jumping frogs, diving mammals, mating animals; thirdly, people and animals in dramatic situations, without any clear movement, two people "in opposition" (Fig. VII), two animals "in opposition" (Fig. IV), a person standing or sitting, animals lying down (Figs. I and VII as well as IV). Person epithets, which Rorschach researchers have not paid attention to earlier, indicate expressive attributes, which more closely describe the human forms that the testee seems to observe in the inkblot: "a fat lady", "a fat old man", "a thin shrew", "a fur clad lady", "a boy in overalls", "a Siberian shaman", "a fur-clad Eskimo", "an African magician", "a cowboy", "Peter the Oaf" (a fairy-tale character),

"a schizophrenic", "a rococo lady in crinolines"; in other words, on the one hand somatic descriptive epithets, and on the other hand apparel attributes, etnographic, psychological and historical epithets. With the assistance of many correlation determinants, by confronting the intelligence quotient on the one hand with the response types on the other hand, we have assigned points to the various response categories. The movement responses comprise three groups: MB-responses (people clearly in movement), which receive 3 movement points, then IB-responses (animals clearly in movement), which get 2 points and finally Mb and Ib-responses (people and animals in a dramatic situation "in opposition", and in standing, sitting or lying forms), receiving 1 point. Epithets are divided into 2 groups: on the one hand the somatic epithets, receiving one point; and on the other hand the psychologically, etnographically and historically descriptive epithets as well as the attire attributes, which receive 3 epithet points. The formal negative intelligence criteria are namely three: perseverations, stereotypes and the only partly interpreted figures. Perseverations are repetitions of the exact same response or an accumulation of weakly varying culinary or anatomical responses (the latter only entrail or only skeletal parts responses). The stereotype range of responses implies varying interpretations within a narrow zoological, botanical or similar type of area, in other words, a greater number (60 % or more) of animal, plants, furniture or anatomical responses. If the word "person" is repeated stereotypically, the response is included in the stereotype group (as also the perseveration group), but if the "people" are more closely characterised regarding sex, age and also provided with expressive attributes, it certainly is not a question of stereotypes, strictly speaking. And finally we have the figures only partially interpreted. There are many testees who first give a whole response, they identify the entire pictorial area, but then go on to the details

and produce quite a few partial responses. This is normal, certainly not suspicious in any way. Other testees perhaps first see a detail, e.g. a dog's snout or two human extremities, and then later arrive at a "secondary whole response". These persons are careful, pedantic types, but their responses can hardly be called "weak", and they themselves can hardly be considered intellectually deficient. But there are some testees who are incapable of viewing the whole picture and identifying is as a whole but rather concentrate only on the details: they see <u>one</u> animal (in Fig. IV), <u>one</u> person (in Fig. VII), <u>one</u> limb identified as a leg, a claw, a profile, a dark spot described as a rib (in Fig. XI) or a witch crouched down (in Fig. VIII) of just as stones (in this same figure).

Perseverations are common among pre-school children and during early school age, as well as among imbeciles. Thus they express intellectual <u>infantilism</u>, in other words this is also found among certain groups of the mentally ill, e.g. among epileptics and greatly depressed individuals who, because of their illness, have reverted to an infantile state. The stereotypical answers again, are common among the mentally retarded and children in early school age and in puberty. Thus they reflect a type of <u>puerility</u>. This is often found among the aging - according to Rorschach, at least 50 % of 50-year-olds produce animal responses and at least 60 % of 60-year-olds. These types of responses appear often among the paranoid and simple, demented individuals (among the latter aside from perseverations), who have regressed, as have the aged, to an already passed but reactualised puerile intellectual level. In regard to children in the pre-puberty stage, the stereotypes can hardly be considered indicators of intellectual retardation; on the contrary, they indicate a type of wish to systematise

and out in order the flow of conceptions. Among the rest of the groups, they indicate what Rorschach denotes as coartation, fossilisation: the retarded are coartative, fossilised from the beginning, the aged are coartated, fossilising or completely fossilised. Regarding the only partially interpreted figures, it appears that age means less: contrary to perseverations and stereotypes, they seemed to increase with increased age. Though, they are common among the mentally retarded. Therefore perhaps they can be considered as an indication of a tendency to analyse on a puerile level and to observe carefully. Imbeciles and small children, on the contrary, usually see unclear, unanalysed, carelessly observed totalities. Perhaps it can be said that this variable reflects a kind of puerile analysis as well as introverted anxiety and precaution along with intellectual helplessness.

Because of the great number of frequency estimates, we have tried to give point values to the various types of negative intelligence variables. For perseverations the following comparison has been made.

The same response:

21 - 30 %	1 point
31 - 40 "	2 1/2 points
41 - 50 "	5 1/2 "
51 - 100 "	16 "

The percentages have been estimated on the basis of the number of responses, that is, not on the number of demonstrated figures or only on the interpreted figures. The stereotypes are estimated similarly and the point values are as follows:

Stereotype (monotonous) responses

60 - 69 %	1 point
70 - 79 "	2 points
80 - 89 "	4 "
90 - 99 "	6 "
100 - "	18 "

Three inkblot figures, in particular, of the fourteen used in the Helsinki test, seem to have created problems even for the normally endowed subjects, in producing whole responses. They are figures V, VIII and XI. A single, only partially interpreted figure is therefore not suspicious, but rather very normal. But if there are several only partially interpreted figures, this clearly implies some sort of intellectual helplessness. Even a single partially interpreted figure can be considered a sign of weakness if the responses are less than fourteen, in other words, the blank responses are one or more. This interpretation variable is estimated, in contrast to stereotypes and perseverations, based on the number of interpreted figures, not on the number of responses. We shall return to the only partially interpreted figures within another context, namely in regard to the determining of attitudes. In a rough, summaric measurement of the degree of intellectual retardation and fossilisation the following point values can be applied:

Only partially interpreted figures:

8 - 14 %	1 point
15 - 21 "	2 points
22 - 28 "	3 "
29 - 35 "	4 "
36 - 100 "	6 "

Three more formal interpretation variables will be presented in this context: the turned-around figures (Omsv.), the pure chiaroscuro light-effect responses (Hd, from German's Helldunkel), and the form chiaroscuro responses (Fhd = Form-Helldunkel). The tester always hands the inkblots to the testee so that the Roman numeral can be seen in the upper right hand corner. A significant part of the subjects, particularly the scientists, notice the Roman numeral and interpret the figure in its original position. Some turn the picture around but finally base their response on the figure in a so-called correct position. These all represent a systematically-functioning type. Pedants are also systematic in their own way, first interpreting the picture in its original position, usually as a whole, then the details, after which they turn the cardboard halfway, give a new whole response and new details, continuing thus turning the picture completely around. Extroverted, impulsive types act differently: they immediately turn the cardboard and often produce responses that are based on the picture in a turned position. It is certainly unfeasible to record statistically the grouping attempts to observe the picture in a position other than the original one. Therefore we have taken note of and recorded only those turned-around responses in which the picture has been interpreted in a position other than its original one. These responses have been estimated based on a percentage of the number of given answers.

The pure Hd-responses are based on a disturbing chiaroscuro light-effect which eliminates a closer observation of the formal elements of the picture and which more often than not is followed by the testee going into a form of shock: "chaos", says a testee referring to picture VIII, "cloudburst, tempest" says another about picture XI. Such responses are recorded among the abstractions. But usually Hd-responses belong to the type including "fire", "smoke", "explosion", "volcano eruption". However the boundaries are fluid:

it is hard to say if a landscape response is a pure chiaroscuro response or not, likewise it is hard to decide whether an entrail response is a Hd-response or not. Thus for practical reasons, in order to make the scoring as simple as possible, we have only paid attention to the content of the responses: therefore pure Hd-responses are those of the type fire, smoke etc. And finally, the Fhd-responses. In our vocabulary they have a different nuance than in that of the Rorschach diagnosticians. First a few examples: an accurate and pedantic observer notices, in Figure VII, the dark silhouette of a dog or a bird against the lighter background of the picture, the testee sees, in Figure VIII, a sitting woman in a long dress or a floating witch in the background to the right, an old man or a few stones to the left; he sees in picture II, a black cross in the centre of the picture. Thus as a rule the Fhd-responses are partial responses (D, German's Detail). In a few cases a geographic response, a map with mountains and meridians are understood as Fhd-responses, and in such cases it is usually the whole background of the picture that is identified. Usually it is the pedantic, anxious type - though not unintelligent - who produce Fhd-responses: they are both subjectively and objectively critical, the totality seems too diffuse and unclear to these critics; the black in the background has sharper contours.

2.3 Evaluation of intelligence

It is not possible to measure intelligence by using any kind of inkblot technique, only to describe it, and perhaps further to evaluate the general level of intelligence. The description mainly aims at disparate attitudes, at different types of intellectual outlooks. We shall examine the attitudes in a later context.

Previously it has been implied that certain formal response variables seem to reflect intellectual helplessness of some kind. There are basically three kinds: stereotypes, perseverations and only partially interpreted figures. According to our calculations they all correlate negatively with the intelligence quotient: the coefficients are -0.92, -0.89 and -0.43. To create a rough evaluation scale for intellectual retardation and helplessness, the point values for these three variables can be added together. Thus the maximum is 40 points, while 0 points indicates the normal standard. It can be mentioned in passing that usually the stereotypes are animal stereotypes. In part, simply because of this, the animal percentage also correlates negatively with the intelligence quotient: the coefficient is -0.44.

Further, we have also indicated previously two positive formal intelligence variables: the expressive person epithets and the movement responses. They both correlate positively with the intelligence quotient: the coefficients are 0.62 and 0.53. Rorschach had already emphasized the importance of movement responses as an intelligence indicator. He mentions two additional ones: whole responses (G = Ganzantwort) and the good forms (F+). Whole responses are, in a way, contrasts to the only partially interpreted figures. But when the G-responses are of different types and numbers for each

individual figure, it is difficult to determine the correlation, practically impossible to determine. What again should be considered as good "form" must be determined from case to case, from figure to figure. Therefore we have worked out a form point-scale, for which only whole responses have been considered and which otherwise is based on the point values of responses for each particular figure of the series of fourteen inkblot pictures. A certain number of subjects is divided up into three groups: the intellectually weakest with an I.Q. less than 90, a middle group with an I.Q. between 90 and 110, and finally the relatively intelligent and highly intelligent with an I.Q. from 111 upwards. On the basis of a rather simple calculation of the correlations, the "good" and the "medium good" "forms" could then be determined and points be given to them on a scale from 1 to 10. The form point-scale, which took into consideration all four of the above-mentioned intelligence indicators when calculated, is as follows:

Fig. I	Human form or doll without an epithet and unspecified sex or age	3 points
	Human form with specified age and sex	6 "
	Human or doll with epithet	6 "
	Human figure with specified age or sex as well as an expressive epithet	9 "
	Fish, unspecified kind	1 "
	Specified fish (flounder, bream)	2 "
Fig. II	Frog, toad	4 "
	Human form with epithet, fairy-tale character, a person in a particular position, crouching etc.	2 "
	Object response	4 "

Fig. III	Butterfly, bat, bird, winged insect	1 point
	Bird, winged insect in flight or about to fly with outspread wings	4 points
	Specified kind of bird or butterfly	7 "
	Specified kind of bird or butterfly with a kinesetetic attribute (in flight, about to fly)	8 "
	Two persons or animals back-to-back	3 "
Fig. IV	Two animals, two animals lying down, swimming	5 "
	Two animals in dramatic contact, "in opposition", sniffing each other, mating	9 "
Fig. V	Human figure, a breast picture, a figure seen in the original position	10 "
	Fur, animal fur, fur rug on the floor	2 "
	Torso, a fat person, a person's trunk, (the picture observed turned-around)	2 "
	A vertebra, two vertebrae	2 "
	Object	2 "
	Landscape (picture seen along the edge)	2 "
	Turtle	2 "
Fig. VI	Clothes (baby clothes, dress on a hanger, (whole response), scarecrow, doll, human with epithet (age or sex alone not sufficient)	4 "

Fig. VII	Two people, two sitting people	5	points
	Two people "in opposition", in dramatic contact, conversing, singing, dancing together	9	"
Fig. VIII	Situation (whole response), people in a fire, in fog, in a spotlight	9	"
	Flower, leaf, branch, tree	3	"
	Landscape, aerial photograph	3	"
	Fire, cloud formation	3	"
	Map, ornament, fingerprint	1	"
	Lungs, entrails	1	"
Fig. IX	Tree, bush	2	"
	Specified kind of tree, bush	3	"
	Specified kind of fruit with leaf (above ground)	3	"
	Specified flower	2	"
	Mammal, mammal head, "animal" with a kinestetic attribute	2	"
	Human figure with epithet (G-response, figure seen in a turned-around position)	3	"
	Object response	2	"
Fig. X	Human figure (not a monkey) with outstretched arms (figure interpreted in its original position)	10	"
	Object (lire, fork etc.)	4	"

	Frog, kinestetic description	3	points
	Cross-section of a flower with its stamina and pistil analysed	3	"
Fig. XI	Satyr form, person with an epithet (G-response)	9	"
	Crayfish, prehistoric animal, primeval deepsea animal	2	"
	Insect	1	"
	Lungs, entrails (G-response)	2	"
Fig. XII	Human, doll of human form	6	"
	Human, doll, specified sex or age	8	"
	Human figure with epithet, specified age and sex	10	"
Fig. XIII	Flower	4	"
	Specified kind of flower	10	"
	Satyr response (G-response)	9	"
	Forms on a pedestal, in a tree	6	"
	Landscape (picture seen from the edge)	5	"
	Object response	4	"
	Oxen head, cow head, etc.	3	"
Fig. XIV	M-answer, picture seen from its original position or turned-around	6	"
	M-response descriptive or a kinestetic attribute	9	"
	Object (not weak responses such as objects like a fishing rod etc.) e.g. building, ship etc.	3	"

In order to get an approximate view of the general development throughout the compulsory school age, we have estimated the average form points of normal pupils in primary and secondary schools and have thus arrived at the following averages for the different age groups:

7-year-olds	(51 fp.)	average points	26.06
8-year-olds	(103 ")	"	27.31
9-year-olds	(75 ")	"	29.04
10-year-olds	(86 ")	"	28.67
11-year-olds	(43 ")	"	27.60
12-year-olds	(84 ")	"	31.59
13-year-olds	(59 ")	"	31.28
14-year-olds	(122 ")	"	33.95
15-year-olds	(146 ")	"	33.56

We notice two apparent notches in the development curve. On the one hand it seems as if 9-year-olds are more intelligent than 10 or 11-year-olds. On the other hand it seems as if 14-year-olds are a bit more intelligent than 15-year-olds. The apparent deviations can be explained. Until the age of 11, primary school children are predominant among our subjects. But a depletion occure at about the age of 10 when a great number of the best pupils transfer to secondary school. Among the 14 and 15-year-olds girls develop faster: the average point for girls at this age is above 36, while for boys it is below 30. But in our material there are relatively more 15-year-old boys than 14-year-olds.

2.4 Description of character qualities

On the basis of a series of factor analysis, carried out on response components of several test groups, both adult and growing children, we have attempted to work out a method of determining and describing character qualities and attitudes among those tested. In doing so we have been able to establish seven different factor groups and work out a kind of index for each one of them.

The first factor (M-factor) has been designated as a dynamic intelligence factor. The positive variables included in this factor are M, Sat., B, Epit., as negative factors T, Anst., Ster.

Index sum for M:

46 - 100 %	+	180
41 - 45 %	+	144
36 - 40 %	+	108
31 - 35 %	+	72
26 - 30 %	+	36
21 - 25 %		0
16 - 20 %	-	36
11 - 15 %	-	72
6 - 10 %	-	108
1 - 5 %	-	144
0 %	-	180

Index sum for Sat.:

31 - 100 %	+	80
26 - 30 %	+	64
21 - 25 %	+	48
16 - 20 %	+	32
11 - 15 %	+	16
6 - 10 %		0
1 - 5 %	-	16
0 %	-	32

Index sum for B:

63 % and more	+	80
56 - 62 %	+	64
49 - 55 %	+	48
42 - 48 %	+	32
35 - 41 %	+	16
28 - 34 %		0
21 - 27 %	-	16
14 - 20 %	-	32
7 - 13 %	-	48
1 - 6 %	-	64
0 %	-	80

Index sum for Epit.:

44 % and more	+	125
39 - 43 %	+	100
34 - 38 %	+	75
29 - 33 %	+	50
24 - 28 %	+	25
19 - 23 %		0
14 - 18 %	-	25
9 - 13 %	-	50
4 - 8 %	-	75
1 - 3 %	-	100
0 %	-	125

Index sum for T:

0 - 16 %	+	20
17 - 21 %	+	16
22 - 26 %	+	12
27 - 31 %	+	8
32 - 36 %	+	4
37 - 41 %		0
42 - 46 %	-	4
47 - 51 %	-	8
52 - 56 %	-	12
57 - 61 %		16
62 - 100 %	-	20

Index sum for Anat.:

0 %	+	2
1 - 3 %	+	1
4 - 8 %		0
9 - 13 %	-	1
14 - 18 %	-	2
19 - 23 %	-	3
24 - 28 %	-	4
29 - 100 %	-	5

Index sum for Ster.:

0 point	(no	monotonous responses	) + 4
1 "	(60 - 69 %	- " -	) - 4
2 points	(70 - 79 %	- " -	) - 8
4 "	(80 - 89 %	- " -	) - 12
6 "	(90 - 99 %	- " -	) - 16
10 "	(100 %	- " -	) - 20

Index maximum: + 491
Index minimum: - 462

High index sums reflect high intelligence. We have mentioned previously that movement responses, epithet and satyra correlate positively with the intelligence quotient; this is also true for human responses (0.39). This means that minors in general, because of their incomplete intelligence maturity, reveal negative index values, as also the less talented subjects. It can be noted that the correlation between the I.Q. and anatomies oscillate around 0. But it is not principally intelligence that this factor reflects but rather a special intellectual attitude.

The second factor, the object factor, reflects extravertive interest and extensive intelligence. The only positive variable is Obj., while the negative are T, Ster., Bl. The variable Obj. correlates positively with the I.Q.

the coefficient being 0.34, while, as mentioned previously, T and Ster. correlate negatively with the I.Q. As with the M-factor, intelligence also plays an important role here. The index for the various variables are as follows:

Index sum for Obj.:

37 - 100 %	+	80
32 - 36 %	+	64
27 - 31 %	+	48
22 - 26 %	+	32
17 - 21 %	+	16
12 - 16 %		0
7 - 11 %	-	16
2 - 6 %	-	32
0 - 1 %	-	48

Index sum for T:

0 - 16 %	+	125
17 - 21 %	+	100
22 - 26 %	+	75
27 - 31 %	+	50
32 - 36 %	+	25
37 - 41 %		0
42 - 46 %	-	25
47 - 51 %	-	50
52 - 56 %	-	75
57 - 61 %	-	100
62 - 100 %	-	125

Index sum for Ster.:

0 point	+	9
1 "	-	9
2 points	-	18
4 "	-	27
8 "	-	36
18 "	-	45

Index sum for Bl.:

no bl. responses	+ 1
1	- 1
2	- 2
3	- 3
4	- 4
5 - 11	- 5

Index maximum: + 215
Index minimum: - 223

As with the M-factor, the Obj.-factor reveals a negative index sum, as a rule, not only for oligophrenics but also for minors.

The third factor, Ant.-response factor reflects extensive animation and activity. The positive variables are Ant.-responses, Dmav. and Landak., the negative variables being Enb.D, and Bl.

Index sum for Ant.-response

33 answers or more	+ 80
30 - 32	+ 64
27 - 29	+ 48
24 - 26	+ 32
21 - 23	+ 16
18 - 20	0
15 - 17	- 16
12 - 14	- 32
9 - 11	- 48
6 - 8	- 64
4 - 5	- 80

Index sum for Omsv.:

35 - 100 %	+ 80
30 - 34 %	+ 64
25 - 29 %	+ 48
20 - 24 %	+ 32
15 - 19 %	+ 16
10 - 14 %	0
5 - 9 %	- 16
1 - 4 %	- 32
0 %	- 48

Index sum for Landsk.:

26 - 100 %	+ 20
21 - 25 %	+ 16
16 - 20 %	+ 12
11 - 15 %	+ 8
6 - 10 %	+ 4
1 - 5 %	0
0 %	- 4

Index sum for Enb.D.:

0 %	+ 9
7 %	0
8 - 14 %	- 9
15 - 21 %	- 18
22 - 28 %	- 27
29 - 35 %	- 36
36 - 100 %	- 45

Index sum for Bl.:

0 blank	+ 1
1 "	- 1
2 "	- 2
3 "	- 3
4 "	- 4
5 " or more	- 5

Index maximum: + 190
Index minimum: - 182

Relatively high positive index values indicate extraversive, affective lability, often even impulsivity, as well as extensive activity. In extreme cases of unusually high index sums it may indicate hypomania, an exalted frame of mind, and in addition, a certain instability. On the other hand, the negative index values reflect a constitutional condition among the intellectually retarded, and an intellectual

helplessness and inactivity, caused by depressions, among the normally talented. Among the highly intelligent the negative values, particularly in conjunction with positive, high index values for the dynamic intelligence (M-factor), indicate a disciplined desire for consistent actions and intellectual control.

The fourth factor, in which the plant responses dominate (Pfl-factor), has been assigned two different versions in the factor analysis, which we have signified as A and B. The positive variables for A are only plant and root responses. The negative variables are fire etc., the number of responses, Omsv., Epit., and B.

Index sum for plant responses A:

37 -	100 %	+	80
32 -	36 %	+	64
27 -	31 %	+	48
22 -	26 %	+	32
17 -	21 %	+	16
12 -	16 %		0
7 -	11 %	-	16
2 -	6 %	-	32
0 -	1 %	-	48

Index sum for root, fruit:

22 -	100 %	+	45
17 -	21 %	+	36
12 -	16 %	+	27
7 -	11 %	+	18
2 -	6 %	+	9
	1 %		0
	0 %	-	9

Index sum for fire etc.:

	0 %	+	9
	1 %		0
2 -	6 %	-	9
7 -	11 %	-	18
12 -	16 %	-	27
17 -	21 %	-	36
22 -	100 %	-	45

Index sum for number of responses

4 -	5	responses	+ 5
6 -	8	"	+ 4
9 -	11	"	+ 3
12 -	14	"	+ 2
15 -	17	"	+ 1
18 -	20	"	0
21 -	23	"	- 1
24 -	26	"	- 2
27 -	29	"	- 3
30 -	32	"	- 4
33 and more			- 5

Index sum for Omav.:

	0 %	+	3
1 -	4 %	+	2
5 -	9 %	+	1
10 -	14 %		0
15 -	19 %	-	1
20 -	24 %	-	2
25 -	29 %	-	3
30 -	34 %	-	4
35 -	100 %	-	5

Index sum for Epit.:

	0 %	+	5
1 -	3 %	+	4
4 -	8 %	+	3
9 -	13 %	+	2
14 -	18 %	+	1
19 -	23 %		0
24 -	28 %	-	1
29 -	33 %	-	2
34 -	38 %	-	3
39 -	43 %	-	4
44 and more		-	5

Index sum for movement responses

	0 %	+	5
1 -	6 %	+	4
7 -	13 %	+	3
14 -	20 %	+	2
21 -	27 %	+	1
28 -	34 %		0
35 -	41 %	-	1
42 -	48 %	-	2
49 -	55 %	-	3
56 -	62 %	-	4
63 and more		-	5

Index maximum: + 152
Index minimum: - 122

In this version, as in the B version, the root responses carry double weight, in a way. They are of course plant responses and therefore have been included among them, but simultaneously they have constituted a variable on their own. The positive variables of the B-version also constitute both plant and root responses (Pfl.); the negative variables are T and Stereo. The index sums are as follows:

Index sum for T:

0 - 16	% +	20
17 - 21	% +	16
22 - 26	% +	12
27 - 31	% +	8
32 - 36	% +	4
37 - 41	%	0
42 - 46	% -	4
47 - 51	% -	8
52 - 56	% -	12
57 - 61	% -	16
62 - 100	% -	20

Index sum for Pfl. as above

Index maximum: + 146
Index minimum: - 82

Index sum for Stereo:

0 point	+	1
1 "	-	1
2 points	-	2
4 "	-	3
8 "	-	4
18 "	-	5

A. The positive index values often imply depressions, probably of a reactive kind. This attitude is primarily characteristic of extraversive, sensible subjects whose weakness has been checked because of dejection. In conjunction with depressions, a conditioned relaxation of the intellectual functions are revealed, because of a perception of insufficiency. The reduced intellectual capacity can even depend on a constitutional disposition (among the less talented). The negative index sum indicates higher intelligence on the one hand, and on the other hand, pleasurable frames of mind, in extreme cases even of excitation and exaltation, among both the extraversive and introversive.

B. The positive index sums indicate an extraversive sensibility in conjunction with depressions, while the negative index values indicate an affective coartation, at times a hard-won external frigidity.

The fifth factor, Enb.D-factor, indicates a general (introversive) depression and reduced intellectual capacity. Positive response variables are Enb.D, Hd, Fhd, and Anat. The index values are as follows:

Index for Enb.D:

36 - 100 %	+	125
29 - 35 %	+	100
22 - 28 %	+	75
15 - 21 %	+	50
8 - 14 %	+	25
7 %		0
0 %	-	25

Index for Hd:

22 - 100 %	+	45
17 - 21 %	+	36
12 - 16 %	+	27
7 - 11 %	+	18
2 - 6 %	+	9
1 %		0
0 %	-	9

Index for Fhd:

28 - 100 %	+	45
23 - 27 %	+	36
18 - 22 %	+	27
13 - 17 %	+	18
8 - 12 %	+	9
3 - 7 %		0
0 - 2 %	-	9

Index for Anat.:

29 - 100 %	+	45
24 - 28 %	+	36
19 - 23 %	+	27
14 - 18 %	+	18
9 - 13 %	+	9
4 - 8 %		0
1 - 3 %	-	9
0 %	-	18

Index maximum: + 260
Index minimum: - 70

The positive index values reflect, on the other hand, a reduced intellectual capacity either constitutionally conditioned or resulting from an illness, or on the other hand, depressions of one sort or another. This tendency seems to be mainly characteristic of introversive character types.

The sixth factor, the T-factor, has been designated introversive coartation and reduced intellectual capacity. The positive variables are T and Stereo, the negative Ant.-responses, Obj., Hd, Landsk., and Abstr.

Index for T:

62 - 100 % + 125
57 - 61 % + 100
52 - 56 % + 75
47 - 51 % + 50
42 - 46 % + 25
37 - 41 % 0
32 - 36 % - 25
27 - 31 % - 50
22 - 26 % - 75
17 - 21 % - 100
0 - 16 % - 125

Index for Stereo:

0 point - 1
1 " + 1
2 points + 2
4 " + 3
8 " + 4
18 " + 5

Index for Ant.-response:

4 - 5 answers + 5
6 - 8 " + 4
9 - 11 " + 3
12 - 14 " + 2
15 - 17 " + 1
18 - 20 " 0
21 - 23 " - 1
24 - 26 " - 2
27 - 29 " - 3
30 - 32 " - 4
33 and more - 5

Index for Obj.:

0 - 1 % + 3
2 - 6 % + 2
7 - 11 % + 1
12 - 16 % 0
17 - 21 % - 1
22 - 26 % - 2
27 - 31 % - 3
32 - 36 % - 4
37 - 100 % - 5

Index for Hd:

0 % + 9
1 - 5 % 0
6 - 10 % - 9
11 - 15 % - 18
16 - 20 % - 27
21 - 25 % - 36
26 - 100 % - 45

Index for Landsk.:

0 % + 4
1 - 5 % 0
6 - 10 % - 4
11 - 15 % - 8
16 - 20 % - 12
21 - 25 % - 16
26 - 100 % - 20

Index for Abstr.:

0 % + 4
1 - 5 % - 4
6 - 10 % - 8
11 - 15 % - 12
16 - 20 % - 16
21 - 100 % - 20

Index maximum: + 155
Index minimum: - 221

The positive index sums indicate coartation, that is, intellectual rigidity and drying-up which is particularly indicative of the mentally retarded and the senile. Among (male) growing children up to the age of about 15, weak coartation phenomena can be an expression of a conscious or unconscious desire to discipline his or her conception process. Among certain mentally ill persons, paranoids and compulsive neurotics, it is an indication of preparedness to fix his or her conceptions within a particular scope of attention. High negative index values reflect affective lability while very high values reflect exalted frames of mind. Positive values should be more characteristic of introversive than of extroversive individuals, while negative values are of extraversive, emotionally labile, uncontrolled persons.

The seventh factor (Perseveration factor) seems to reflect general (extraversive ?) depression and intellectual infantilism. The positive variables are Perseveration, Anat., Stereo and Md, the negative variables are Landsk., Hd, Epit., Zw, Satyr, Obj., Omsv., and B.

Index for Perseveration:

	16	points	+ 125
4,5 -	9	"	+ 100
3,5		"	+ 83
2,5 -	3	"	+ 75
	2	"	+ 50
	1	"	+ 25
	0	"	- 25

Index for Anat.:

29 -	100	%	+ 45
24 -	28	%	+ 36
19 -	23	%	+ 27
14 -	18	%	+ 18
9 -	13	%	+ 9
4 -	8	%	+ 0
1 -	3	%	- 9
	0	%	- 18

Index for Stereo:

18	points	+	5
8	"	+	4
4	"	+	3
2	"	+	2
1	"	+	1
0	"	-	1

Index for Md:

22 -	100	%	+ 20
17 -	21	%	+ 16
12 -	16	%	+ 12
7 -	11	%	+ 8
2 -	6	%	+ 4
	1	%	0
	0	%	- 4

Index for Landsk.:

	0 %	+ 16
1 -	5 %	0
6 -	10 %	- 16
11 -	15 %	- 32
16 -	20 %	- 48
21 -	25 %	- 64
26 -	100 %	- 80

Index for Hd:

	0 %	+ 9
	1 %	0
2 -	6 %	- 9
7 -	11 %	- 18
12 -	16 %	- 27
17 -	21 %	- 36
22 -	100 %	- 45

Index for Epit.:

	0 %	+ 45
1 -	3 %	+ 36
4 -	8 %	+ 27
9 -	13 %	+ 18
14 -	18 %	+ 9
19 -	23 %	0
24 -	28 %	- 9
29 -	33 %	- 18
34 -	38 %	- 27
39 -	43 %	- 36
44 and higher		- 45

Index for Zw:

	0 %	+ 4
	1 %	0
2 -	6 %	- 4
7 -	11 %	- 8
12 -	16 %	- 12
17 -	21 %	- 16
22 -	100 %	- 20

Index for Satyr:

	0 %	+ 8
1 -	5 %	+ 4
6 -	10 %	0
11 -	15 %	- 4
16 -	20 %	- 8
21 -	25 %	- 12
26 -	30 %	- 16
31 -	100 %	- 20

Index for Obj.:

0 -	1 %	+ 12
2 -	6 %	+ 8
7 -	11 %	+ 4
12 -	16 %	0
17 -	21 %	- 4
22 -	26 %	- 8
27 -	31 %	- 12
32 -	36 %	- 16
37 -	100 %	- 20

Index for Omsv.:

	0 %	+ 12
1 -	4 %	+ 8
5 -	9 %	+ 4
10 -	14 %	0
15 -	19 %	- 4
20 -	24 %	- 8
25 -	29 %	- 12
30 -	34 %	- 16
35 -	100 %	- 20

Index for B:

	0 %	+ 5
1 -	6 %	+ 4
7 -	13 %	+ 3
14 -	20 %	+ 2
21 -	27 %	+ 1
28 -	34 %	0
35 -	41 %	- 1
42 -	48 %	- 2
49 -	55 %	- 3
56 -	62 %	- 4
63 and higher		- 5

Index maximum: + 300
Index minimum: - 303

This perseveration factor is to a large extent determined by the influence of the intelligence factor. Imbeciles and the mentally retarded as well as feeble epileptics have obtained positive index values, while highly intelligent persons have obtained negative values. The intellectual laxity, which has a clear infantile character and which can therefore be indicative of imbeciles and rigid epileptics, can just as well be caused by deep depressions as by innate factors. It is obvious that the depression, which the perseveration factor reflects, is primarily characteristic of the emotionally labile, the more or less uncontrolled, extraversive character and temperament types. Negative index values are indicative of a well-kept intellectual status, an intensive or extensive liveliness, activity and awareness, undoubtedly even to a certain extent of an optimistic keynote. Very high negative values can be indicative of an extraversive, hypomanic exaltation in an individual diagnosis.

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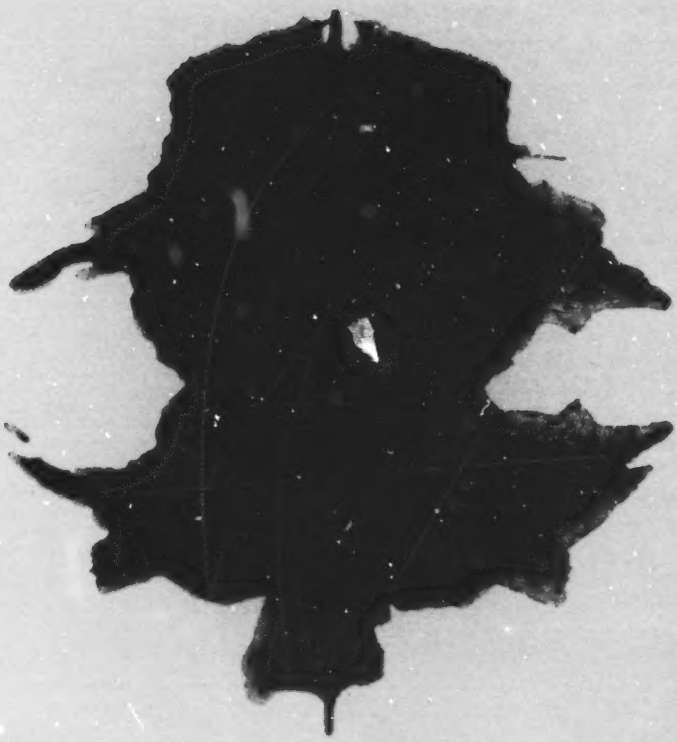
THE TEST FIGURES

I

II

III

V



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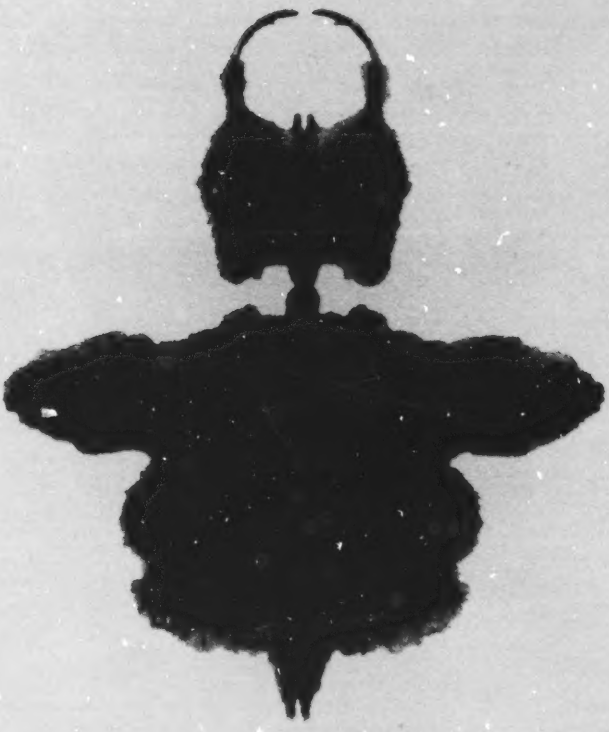
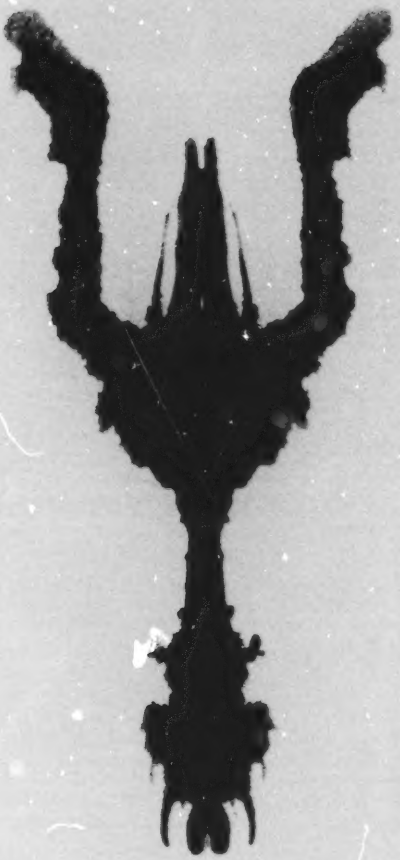


VII

VIII

IX

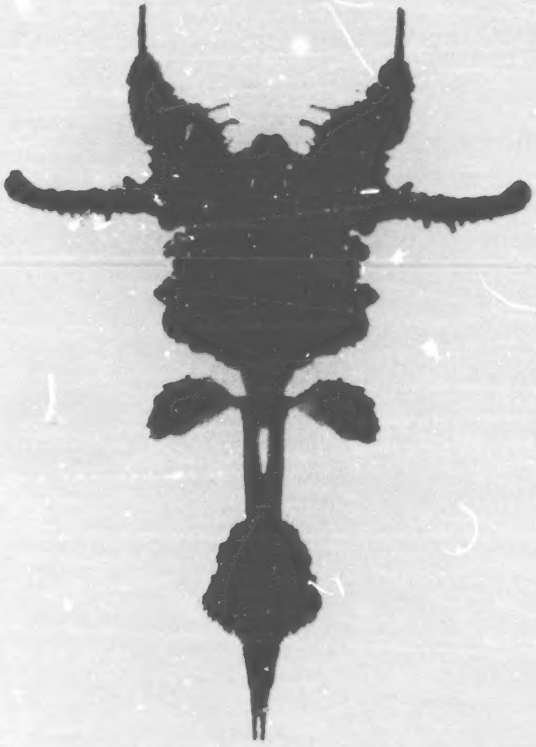
X



XI

XII

XIII



XIV

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